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ABSTRACT

Learning that can occur through small group work is considered. Practitioners and advocates of the method describe learning through small group work as active learning that is deeper and more enduring than passive learning. The key is that students are personally engaged in the work and peer interaction is seen to be a major facilitating factor for learning. The research evidence suggests that small group discussion methods can be effectively used to transmit facts and principles, and that discussion is a superior method for the promotion of thought. It is suggested that a distinction be made between process-centered groups (primarily concerned with the learning experiences deriving from the process of active participation in a group) and task-centered groups that are occupied with completing specific tasks. The uses of process-centered groups include: understanding interpersonal interaction and the underlying dynamics of group process, and the development of skills in interpreting and manipulating group processes. Examples of task-centered group activities are: the application of principles to both familiar and unfamiliar situations, acquiring and practicing skills, making a critique, and data interpretation. (SW)

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TEACHING IN HIGHER EDUCATION SERIES : 5

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Suggestions for the consideration of lecturers and others concerned with teaching in higher education

A KIND OF LEARNING

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FOREWORD

This booklet is one of a series produced with the aid of a grant from the University Grants Committee as part of its programme for the development of knowledge about and skill in teaching in higher education. The series is intended to bring together traditional wisdom (not a source to be neglected) research findings when available and relevant, and summaries of what is regarded by the informed as good practice.

The sub-title "Suggestions for the consideration of those concerned ..." echoes that of a famous manual for the guidance of elementary school teachers and this series shares the same purpose. The handbooks may at times be mildly hortatory but they are not meant to be prescriptive. Teaching is something of an art and the aim is to encourage, within sensible limits, something of a personal style. The "rules" (if such they be) are constantly broken by successful teachers but few, if any, get away with breaking all the rules all the time.

Universities and other institutions of higher education have traditionally accepted research and teaching as their principal functions. The systems developed for training in research are well worked out. Till now little has been done for teaching. The initiative taken by the University Grants Committee was widely welcomed and has led to an increasing awareness in higher education generally of the importance of giving to the teaching function the attention it deserves. This series is intended to offer help to those who wish to make an effort to improve their teaching. It is hoped that those who read these pages will, as a result, be better prepared for this important aspect of their daily work.

The authors would be glad to receive reports and illustrative material which readers may wish to send with a view to improving the next edition of these booklets.

C.F. CARTER
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PREFACE TO THE FOUR BOOKLETS ON SMALL GROUP TEACHING

WORKING TOGETHER — PARTICIPATORY DISCUSSION
A KIND OF LEARNING — PATTERNS AND PROCEDURES

Seminars and tutorials, though sometimes formally defined, embrace a wide range of activities; choices must be made. These booklets are to introduce the new tutor to the strengths and weaknesses of the small group and to ways of organising it for different purposes. We describe:

Group behaviour.
This is the main part of "Working Together".

Strategies for making group work more effective.
These are the strategies for improving a group's working together (in "Working Together") and strategies for achieving different intellectual objectives, set out in "Patterns and Procedures" and "A Kind of Learning".

Tactics small group tutors can use.
Group management and discussion skills are described in "Working Together" and "Participatory Discussion". The organisation of group work and the usefulness of different procedures are discussed in "Patterns and Procedures".

What can be learned through small group work.
This is what "A Kind of Learning" is about; group learning is discussed in relation to the claims of enthusiasts, research studies and some examples of group activities.

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INTRODUCTION

Like every other teacher the university lecturer begins by asking what kind of learning he means to bring about by the different methods he uses - in this instance by teaching through small group work. Part I of this booklet "What can be learned?" is about the kind of learning reportedly resulting from the best use of this method. This emerges from many studies as being co-operative learning; learning that comes about through the interaction of the students in the group and their participation in the group's work. However, many of these studies have been made by advocates of co-operative learning who sometimes see it as the ideal means to every end: the mastery of knowledge, understanding of concepts, the acquisition of intellectual skills. These claims are looked at in the context of surveys of research into the effectiveness of teaching methods. What is the inexperienced tutor to make of them?

Part II: "What groups do best" is a general statement, not an authoritative one, though it is presently well accepted; there will be those who disagree with what we say. But this is a question that everyone must resolve for themselves before planning a course of small group work. What can your students best learn about your subject through small group work? We offer examples to show how one might set about it.

PART I

WHAT CAN BE LEARNED?

1. THE CLAIMS OF ENTHUSIASTS

In introducing the lecture we looked at research into the comparative effectiveness of different methods for

transmitting information,
promoting thought and other cognitive skills,
changing attitudes.

We look at small group teaching this way but many of the more interesting reports on learning in small groups come from practitioners of the method who are also its advocates. Many are teachers and educationists of experience and mature judgment but they substantiate the claims they make for small group teaching from their own experience. The inexperienced tutor would expect to learn most from them.

What are the aspirations of the small group enthusiasts? They describe learning through small group work as being deeper and more enduring than passive learning; the students are personally engaged in the work and this is the key. If knowledge is "to be incorporated rather than merely appended it must pose some problem, extend some challenge, answer some longing". (Duberman.)[1] That is to say it must have some personal relevance. The small group is well-suited to creating exactly this kind of learning experience. Discussion allows for the

examination of beliefs. (And since personal beliefs are formed in a multi-dimensional setting they cannot be challenged in a uni-dimensional setting, such as a lecture;[1] the small group propagandist frequently uses it as a stick to beat the lecture with.)

Small groups foster <u>active</u> learning, it is claimed. "The great advantage of the small group is in facilitating understanding as distinct from mere acceptance of information - in helping the student to comprehend it, grasp it, make it his own". (Abercrombie)[2] And students are reported "to increase their ability to communicate and their inter-personal skills; to gain a sense of responsibility for their own learning ... and improved critical thinking as well as increasing their ability to use knowledge". (Beach)[3]

It is proposed that the strengths of the small group lie in the active part students play, when they participate directly in what goes on, and in the interaction with their peers that the small group engenders. Peers have a better understanding of what is relevant to an individual, and of his difficulties. They share the same language conventions. Thus "learning in groups helps the student to share both his ignorance and his knowledge ... and prepares him for a flexible attitude to the roles he will need to play in teaching and learning throughout life ... to learn a subject in such a way that he also learns how to continue to learn". (Abercrombie)[2] And "the distinctive potential of small group work lies in the expression of a diversity of views and interpretations, and its distinctive style is reciprocal. Each member contributes his own ideas, and reshapes them in

the light of the contribution of others".

It is through this interaction that inter-personal evaluation begins and understanding of others leads to self-knowledge. Each student has his own "individual pre-conceptions and modes of thinking and these profoundly influence the understanding of any statement made to him". Through discussion "his bias is exposed and eventually corrected by other students as the latter gradually formulate their thoughts during uncontrolled discussion".(4) Discussion of this kind clarifies their thoughts and unravels confusions. It seems likely then that attitudes may effectively be changed.

However, it is reportedly easier to change a group's attitudes than an individual's. And it cannot be verified that the values a group establishes as its norms, which may involve significant changes in attitude for some members, endure beyond the life of the group. To 'fix' a new attitude it may be necessary to use it in the sense of taking deliberate courses of action based on it.(5) Groups 'unfreeze' old attitudes more successfully perhaps than they inculcate new ones.(6)

The emphasis, it will be noted, is placed on discussion as opposed to other possible forms of activity and as peer interaction is increasingly seen to be the major facilitating factor for learning so the discussions are freer and directed less and less by the tutor. Logically he is dispensable and becomes so. Reports suggest that tutor-less groups do not differ significantly in their achievements of measurable learning outcomes from more

conventionally structured and directed groups. And in relation to the extent that students accept, or are given, responsibility for their own learning, they gain in immeasurable ways. There is an increase in students' interest in their work, slight but persistent increases in indices of curiosity, an impression is gained that their use of spoken and written language improves and they read more outside course requirements.(7)

Small group learning, at its best, then leads to the absorption of factual knowledge, the unravelling of biases and misconceptions, the development of true personal understanding of a subject in such a way that knowledge and ideas become uniquely each students' own knowledge and ideas. And this kind of learning is primarily a function of interaction - especially with other students. The interaction is most effective when it is least controlled by an authoritative tutor; indeed, for some, tutor-less groups may be the ideal learning situation. These are the claims of the enthusiasts.

2. WHAT IS THE INEXPERIENCED TUTOR TO MAKE OF THESE CLAIMS?

It will have been noticed that much of what the enthusiasts claim that students can learn through group work is not easily quantifiable. Anyone who is interested in what may be thought of by many as the higher order learning that is immeasurable should turn directly to such wise, perceptive, experienced and stimulating authors as Abercrombie, Beach, and Duberman; they must be listened to. Abercrombie has written a comprehensive study on small group teaching that goes beyond reporting on her own work; it is essential reading. But where the claims of the

enthusiasts are quantifiable it must be asked whether other research studies support their claims and to what extent these claims can be realised by using other teaching methods. It is easier to ask than to give an unequivocal answer.

Research into higher education is at an early stage in its development. It lacks both normative theories to secure its foundations and an unequivocal body of data from which such theories might be constructed. Comparative methods research is more open to criticism than almost any other field. A method is not an independent variable, interacting as it does with subject matter and many facets of both teachers' and students' personalities, objectives and aptitudes. And comparisons between methods are usually falsely antithetic when measured by learning outcomes. How is one to attribute a particular piece of learning to any one part of a student's multifarious activities?

Small group methods, being variable in form and dependent on the skills and personalities of all participants, are particularly ill-adapted to this kind of investigation. That being said, it can be stated that cautious and knowledgeable reviews of comparative research accept that there is evidence suggesting that small group discussion methods can be effectively used to transmit facts and principles, and may be more effective than, for example, lectures, for students of lower academic ability or for very complex material. And there is a slight suggestion from the data analysed that material learned in small groups may be retained for periods going beyond the length of the course.(8)

What of higher skills and understanding? Again research evidence is slight - what standard measures are there for higher cognitive skills? But such evidence as is accepted is bolstered by present knowledge of the psychology of learning. There is a general consensus that discussion methods are superior to any other for the promotion of thought, interpretation of information, developing critical judgment and solving problems.(8)

If the advocates of co-operative learning are reasonably correct, then, in their description of the kinds of learning that result from teaching in small groups should the inexperienced tutor adopt their methods as well as their aspirations? He would be ill-advised to do so. Free discussion appears to be important to the realisation of the highest levels of learning described above, but if it is a method that suits you and suits your subject this kind of discussion should be introduced into small group work little by little; do not give a course wholly over to this form. Experience and developed skill are needed to handle free discussion groups. Inexperienced tutors may easily fall into the trap of confusing informality with freedom in a small group. Informal groups are not necessarily undirected. Indeed it can be suggested that informality increases the authority of the tutor for his behaviour and judgments may become the touchstones of the group. His influence may be counter-productive to the growth of individual understanding and personal judgment.

In setting out their views and reporting on their own experience advocates of free discussion methods cannot and do not estimate the extent to which their personalities,

enthusiasm and developed skills contribute to their group's achievements. (Even in tutor-less groups are they very far away?) It would not be surprising if new tutors cannot realise the expectations induced by such reports. This should not lead to dismissing them but to consideration of what they reveal of skills and attitudes towards small group work that the new tutor can at once set out to acquire. For instance in the conduct of free discussion it is apparent that one skill the tutor needs to develop is that of listening. Controlled experiments show that tutors in conventional seminars talk for over 50% of the time available.[9] Students should benefit from whatever attempts a tutor makes to restrict his contributions. (See "Participatory Discussion" - the companion booklet that deals with discussion skills.)

The small group teaching of a new tutor can be thought of as open to development along a line fixed by the co-ordinates of his specific objectives and of his growing expertise. The line may lead to group teaching that is progressively destructured as his skill increases. He must also bear in mind the expertise of his students. In the transition from school to university their learning environment changes drastically and they may never have experienced free group work in any form. It may be necessary on introductory courses, even of a kind well-suited to freer discussion, to begin with a firmly structured group. As their university career develops so may their group skills (see "Working Together") and, again depending on the nature of the course and the suitability of the chosen group form, they may gain the benefits set out above from the use of more open learning situations. We discuss different ways of organising group work in "Patterns and Procedures".

3. THE IMPORTANCE OF GETTING STUDENTS TO USE THEIR OWN WORDS

There is one final pointer from research towards the importance of including some element of discussion in small group work if it is to achieve the broad aims that derive from co-operative learning. This kind of learning stems in part at least from discovered meanings: personal meanings that relate words to reality. It is impossible for a formal education system to provide opportunities for every student to publicly examine such meanings at every step; a university student can reasonably be expected to be responsible for extracting such meanings for himself. But recent research[10] suggests that not all students are equally equipped for this task. Faced with the formal discourse of lectures or books, listening to the exact and economic explanations of a tutor some students see their task as being that of learning the discourse itself. Marton's[10] research shows that such students can be distinguished, both experimentally and in relation to their normal studies, from a second type of student who learns through the discourse. This second group try to "get at the point" of what they study, to think it out in their own terms.

The difference in approach may stem from differences in students' habitual use of language and are not, according to Marton, to be thought of as fixed attributes of any particular type of student. Those who settle down to learn discourse as though the meaning lies in the words themselves may ordinarily use language for mainly social purposes and may not be accustomed to the abstract use of language in real life situations.[11] Obviously then they do not study Smith's work as "one way of

looking at X", Brown's lecture notes as "his general view", nor seek to winkle out the underlying principles that both Smith and Brown are concerned with; Smith's expressed view of X has to be learned, so too has Brown's. These students read less - one cannot have the same appetite for reading steadily through texts as one might have for mining them - and though they may organise their work well their methods are thus less effective. Effective study methods are one factor that does correlate positively with high levels of academic achievement.(12)

Clearly, then, if one accepts Marton's findings it does become important to give students opportunities to express what they think they have learned in their own words and it is equally important to ensure they they understand the necessity for doing so. One would therefore include some discussion in small group work; it may also be sensible to show students that a major purpose behind using it is to make their independent studying more effective. Students who try to translate what they hear and read into their own language,(13) who talk about what they are studying or about what the principles are behind the methods of analysis they use rather than just learning the methods and practising them;(14) these students make more of what they study, their methods are more effective and because of this they perform at a higher level than they might do otherwise.

PART II
WHAT GROUPS DO BEST

In general terms small groups can best be used

* to promote understanding of a body of knowledge and the relational thinking that this needs
* to elucidate misunderstanding and sort out students' difficulties
* to practise skills - intellectual, verbal, computational, social
* to practise the application of principles to familiar and unfamiliar situations
* to explore personal and professional attitudes and values
* as a two-way exchange of information on the teaching-learning process.

In all these instances, as they work, students will use what they are learning or have learned elsewhere. In order to give up as much time as possible to these student activities the tutor probably creates the framework and prepares the ground for group work elsewhere - in lectures, by handouts, at a preliminary group meeting.

Small groups can be used for

* the transmission of new information
* instruction in skills, problem-solving strategies
* further exposition of difficult topics.

But this is not what the small group does best, and unless there is a generous allowance of time for small group teaching it is better, in the sense of being more efficient, to make provision for these teaching activities elsewhere. Where these teaching activities necessarily overlap with what we can loosely call the students' learning activities (we listed these first), then, where possible time should be set aside specifically for, say, exposition by the tutor. The point is that if the best possible use is to be made of small group work the greatest possible amount of time should be kept clear for those student learning activities.

Sometimes, of course, one can stand these recommendations on their heads. For example, while it is ordinarily less efficient to use the small group for exposition of a topic - the small group does not function well when there is concern for coverage; the pace is slow so each meeting can only be used for limited tasks; "a context of coverage"(15) is better supplied by other experiences such as independent study, learning programmes and lectures - there is a case for doing so in certain circumstances. Where the material is unusually complex, requiring step-by-step exposition, where discussion and feedback on comprehension are needed to regulate the flow of information or where less able students need to have material presented to them in more than one context then the small group may be an excellent place for presenting a subject.

Another example would be when a lecturer uses a small group in order to demonstrate a tricky experimental procedure or the use of special equipment; everyone must have a clear view at close hand of what he is doing.

Similarly students are learning by observation in small groups during real-life clinical sessions; a ward round, the examination of a patient, an interview, are all necessarily dominated by and directed by the professional teacher, students participating only when specifically invited to do so. In these cases provision is made for discussion or for practising skills later.

As a last instance we could take the 'master driving' demonstration which is a quasi-lecture. The lecturer demonstrates (he has expounded strategy and procedures elsewhere) the approach to and possible methods of solving a variety of problems. He would not have been able to cover them in such detail during a lecture proper, so now he talks his way through them and while the students do not participate unless invited to do so they can interrupt with questions when they fail to see the reasons for taking any step.

In general terms students' contributions to a group's work are used in two different ways. Students' contributions may be whittled down. Sometimes a group works (through discussion, case-studies, games or simulation exercises) towards the solution of a problem, a diagnosis, the resolution of management decisions, or the formulation of a principle. At first everyone freely advances views and information but these are gradually reduced, by refinement and elimination, to an agreed general solution. Groups work slowly in comparison with able individuals but in educational small groups it must always be borne in mind that, as Stenhouse[15] reminds us, the task is there for the group and not the group for the task. In making a diagnosis, for instance, the test is not the

accuracy or completeness of the diagnosis but whether everyone participated in and learned from making it. Correct solutions can always be circulated later. But while a group works more slowly than an individual and its overall performance is not usually at the level of its best member[16] groups are more likely to come up with accurate responses. Clearly group work is an excellent means of teaching (through practice and demonstration) about appropriate levels of accuracy, acceptable error, how to make estimates and other such judgments. Groups make fewer errors than individuals - there is a pooling effect - they check errors more often, see flaws more easily and have more information and ideas available to them.[16]

On other occasions the group conserves information - in making a critique or analysing data, in reviewing the interplay of ideas and events, the purpose may be to arrive at as full and rich an interpretation as possible. Here, too, the members learn to exercise judgment, of what is relevant and of the relative significance of different factors, and they gain from exposure to a diversity of perspectives and views and from reactions to their own contributions. Editing of contributions is a group activity but it is an integrative rather than a reductive activity.

1. TWO MAIN TYPES OF GROUP WORK

Speaking very broadly, and in practical terms, there are two main types of group work. It seems to us useful to distinguish between them arbitrarily as process-centred groups, primarily concerned with the learning experiences

deriving from the process of active participation in a group, and task-centred groups occupied with completing specific tasks. But although the usual concern of process-centred groups is the analysis of values and attitudes, or the group process of interaction itself, these are often seen more clearly when looked at obliquely. So process-centred groups also have tasks. What are these to be?

Perhaps one should begin by considering the context into which group work must be fitted. All manner of constraints may limit the choice of activities. We examine some of these in "Patterns and Procedures". Here we show several examples of the kind of activity that is appropriate to group work. They can be modified for specific courses, for particular groups of students and to match the experience of both students and tutor. Examples of the use of small group work in practice in different areas of study are described in publications listed under further reading on page 30.

Before looking through the examples we give, consider that there is always a need for some kind of common ground upon which the group can meet each other's minds.(2) In process-centred groups the common ground is really the group itself. They are primarily interested in the ways in which they shape each other's expression, responses, ideas and attitudes. Where garnering of information, practical exercises or field work are part of their activities they are often mainly intended to throw up ideas and generate interaction. Other material may be brought into the group for specific purposes by the tutor or in response to the group's

expressed needs.

In task-centred groups (the distinction is often blurred) the planning of the common ground is an essential preparation by the tutor. This may or may not be discussed first with the whole group. The common ground may be

a text
a sequence of problems
a lead-in lecture
a video-tape or film
a preliminary mini-lecture
a presentation by one or a group of students
a model the group will work with
students' essays, papers, notes or translations
a map
a set of illustrations
folders of documents
research papers
prescribed preliminary reading.

It is always worthwhile exploring the possible use of other media. Visual presentation can be used to demonstrate skills and present data or examples. Films and television can bring real-life situations or specially produced case-studies into the group. And the small group is an excellent context for the use of models. Discussion groups can be effectively gingered up by starting with, or interpolating, material in a variety of media that may force students to reconsider issues. Such material can be provocative, 'mind-bending' and instinct-confounding. The impact may be increased by requiring student preparation that demands their prior formation of judgments.

From discomfiture may come new understanding. A recent development of films produced specifically for use in contexts like this is the "trigger film".[17] Such a film is not a complete and logical presentation; it lacks connections, does not complete its statements, includes tangential allusions and so forth. Its viewpoint may be completely unexpected. The purpose is to provoke and startle, and to expand imaginative conceptions of what something is really about.

2. EXAMPLES OF PROCESS-CENTRED GROUP ACTIVITIES

These groups often need more than the customary 50 minutes - 1½ or 2 hours are more suitable.[18] They are usually entirely occupied with free, associative discussion and this is slow. They may engage in games-playing or simulations or case-study work but the task thus set up is often only a means of generating involvement. Process-centred groups are seldom tightly structured. It should be borne in mind that the less structured a group is the more stable a context it requires. Meetings should be regular, always in the same place, furniture should remain in the same arrangement from week to week, and preferably seating would be uniform and in a circle.[19] The tutor should never be late.

Most small group work is part of a larger instructional strategy,[20] and when there is often little enough room for sharply-defined 'essentials' woollier process-centred group work can be elbowed out. Besides, few lecturers have the time, inclination or incentives to acquire the experience and understanding necessary for

conducting it. The kind of learning experiences fostered by this kind of group has not always received the attention it deserves.

Process-centred groups can be used for

* the understanding of interpersonal interaction in groups and the underlying dynamics of group process
* the development of skills in interpreting and manipulating group process.

These purposes underlie the training of professional workers in the health and social services. Within higher education they are applicable to work in such fields as social and psychiatric medicine, business management studies and all the disciplines associated with social sciences and social studies. In higher education it is not uncommon to find group activities studied as a group activity in a more formal fashion. Thus games-playing and role-playing in simulations of real life situations become a form of case-study. Such activities foster both understanding of the dynamics of group interaction and insights into the nature of particular social problems.

Another important application of this kind of group work is

* developing professional skills in communication.

In law, engineering and architecture, for example, there will be a requirement for many graduates to communicate with lay clients and to participate in multi-professional decision-making bodies. Skill in preparing oral and written reports needs to be practised.

Role-playing and decision-making games help here and open-ended discussions of current controversies, of the use of language and analogy-making[21] in scientific disciplines, and of the importance of social and economic factors, can foster ease of communication.

Process-centred groups are also used to promote

* the understanding of personal bias and the 'anatomy of judgment'.

There are noticeable gains in 'professional objectivity' when biologists, medical students and architects follow a course in associative discussion with this aim in mind.[2] Clearly historians, students of literature and anyone concerned with developing critical judgment would benefit in the same way. Such groups usually begin with a session studying X-rays, a philosophical statement - something that requires them to form a judgment. During the discussion that follows they compare their understanding with that of their peers.

Open-ended discussion in small groups is used for

* exploratory or creative problem-solving.

This use of free discussion groups is very attractive in such areas as cross-disciplinary studies. The interaction within a group, of members differently biased and with distinct skills and knowledge, can be productive of ideas for project work and special studies. It has been suggested semi-seriously that Watson and Crick might have arrived at the double helix far earlier had they had a sculptor in their team.

Brain-storming is the simpler approach. Everyone freely

and spontaneously throws in suggestions as fast as they come up. Every apparent irrelevancy is explored or opened up to exploration for fruitful lines of progress. This can also be a useful technique to use occasionally to overwhelm fears of criticism, encourage participation and boost critical thinking.[22]

The more rigorous technique called 'synectics' seeks to promote creative efficiency by establishing analogical communication between people with very different habits of thought. This special kind of associative discussion is thought to give greater insight into the irrational elements of thought and perhaps to extend some control over them. Clearly the hope is that this will lead to new success in solving problems.[23]

The constraints on creativity can also make an interesting study. Economic factors are often included in project work amongst applied scientists. These and the many other considerations that commonly restrict designers on the ground are fruitful subjects for associative discussion in their own right. One could construct a game in which two sides take turns, the one side making creative or constructive suggestions, the other blocking them at each step. Group solutions to problems are not always the best possible ones but the best solutions cannot always be effected when one has to work with groups.

4. EXAMPLES OF TASK-CENTRED GROUP ACTIVITIES

We cannot present a list of all possible uses of the small group; we offer examples to set you thinking.

The small group can be used to study

* the application of principles to both familiar and unfamiliar situations

Most tutors are well used to this kind of group work; we leave you to think up, for example, problem-solving exercises for use with your groups. To have students working routinely through problem sheets is only one way of conducting them. Students can try their hand at problems at home and come to a tutorial to discuss strategies and the misunderstandings that lie behind common errors. Many students do not know how to use different lines of attack in approaching a problem. Students can work together in sub-groups for part of a tutorial; the rest of it is given, as above, to discussion of tactics. Larger scale problems or small projects can be worked at by the group as a whole - or tutorials can be given over completely to the discussion of the design and organisation of experiments or field-work.

Group work on case-studies is common in many disciplines. The ground may be prepared by a lecture on the principles governing analyses of cases for particular purposes. The actual cases can be presented on film, tapes, as a visual display or in booklet form for systematic, co-operative analysis by the students, probably followed by a more open discussion session. Cases should be carefully tailored to the group's needs. The relations of general principles to specific instances can, too, be discussed either as a preliminary to or after field-work of various kinds. The fieldwork itself would provide the instances.

The construction, the analysis or simply discussion of a structural model - a molecular model, a town plan, an engineering construct - can provide excellent opportunities for showing how principles apply in practice. Discussion can focus not only on the particular principles as illustrated in the model but on the problems that were solved in arriving at the model, the variations in structure that are allowable, the margins of error that are acceptable and what practical problems adoption of the model might cause in related systems.

The exercise of professional judgment can be practised in clinics or workshop projects. A small group can work at designing an instrument or a research study, at diagnosing ills in the body politic or human. Then simulation of patient management, or the carrying out of projects with the aid of a computer or in a laboratory, perhaps performing the play, are all useful extensions of such exercises. Students can, too, work together on the translation of a text, sometimes co-operating from the beginning, sometimes working individually to start with. Individuals assemble information or materials, perhaps, or think out ways they might tackle the task themselves. They meet to pool material and strategies and to arrange a programme of work, where this is necessary, that takes in as many contributions as possible.

Groups can also work together at a more elementary level

*acquiring and practising skills.

There are basic skills, or facilities, and higher order skills. Basic skills can be practised in skills sessions where students can be as much, or more help to each other

than a tutor always is. Since they are in the same boat they sometimes see each others difficulties clearly. Phonetics can be learned with the help of video-tapes. Prepared tapes, or tape-slide packs and recording equipment can similarly be used for practising laboratory manipulations the use of equipment or the classification of specimens of many kinds. Groups can practise the skills of computation, making estimates, costing, error assessment, logical or linguistic analysis, and handling equations. Sessions can be enlivened by quizzes, games-playing or jokers in the pack.

Higher order skills may be practised in evaluatory or interpretive exercises such as evaluating a range of historical sources, making a literary critique or interpreting scientific or sociological data. Other exercises could include the refutation of shaky hypotheses (students are not always exposed to enough of these) or the examination of a series of plausible alternative solutions or explanations of real problems and events.

Consider making a critique.[24] The first steps are analytic. Inexperienced students can make heavy weather of this. The criteria, terminology and logical way of proceeding ordinarily used should be described, and named, in an earlier lecture or handout. A series of exercises can then consist of first discussion of examples of reasoned critiques, then discussion and practising of the component skills used and then, finally, the students work together on the evaluation of a text. One of the component skills often ignored is the ability to read critically in the first place. New students may need guidance on this. Get them to ask both "What does he say?" or "What has been

found out?" and "What is he driving at?" or "To what end?" When they first embark on a joint critique begin with points of agreement and disagreement, list them on the board, ask for supportive evidence or reasoning. Next the points have to be re-ordered, grouped to strike balances and a judgment formulated.

Now consider data interpretation exercises. Students often enjoy and learn a lot from these. First year students, for instance, tend to over-generalise from evidence.(25) Set them to drawing inferences from raw data, play the devil's advocate and get them to discuss all the explanations offered, valid, partially valid or nonsensical. Selections of raw data from original papers provide excellent material for discussions of method and of how important theories build up from many small discoveries. Inexperienced students expect better results and less fallible theories(25) than is normally possible in much research work. A member of staff can present details of an experiment or a piece of on-going research - not only his reports but his traces, computer print-outs, material samples. Students could spend an hour examining these and then take another to discuss techniques, assumptions, causal relations, how meaningful the results are and so forth. If the data used in this kind of exercise are taken, on the other hand, from published papers these can be given to the students to consult after the group enquiry. More advanced students may enjoy re-working older 'classical' papers using more modern and sophisticated techniques. How many older findings of statistical significance can be discounted when regression to the mean is allowed for?

All sorts of exercises of this kind can precede discussion of the nature of enquiry, of creativity, of the climate of ideas at different periods or of the importance of the availability of knowledge. How were ideas arrived at, what further enquiries sprang from them? Original papers, when these are used, give some feeling of the climate of accuracy, the compromises and the quality of honesty in different kinds of research.(26) Students can learn, too, to use the 'technique of suspended judgment'(21) and the pitfalls of premature conceptualisation.

Small groups have always been advocated as a means of

* promoting understanding.

"The essential point about understanding (a term difficult to define) is that it is both personal and public. An understanding implies a grasp of a relationship on the part of an individual. It is an experience leading the individual to claim 'I understand'. But it is characteristic of education that it is concerned with public criteria."(15) In a small group each member contributes his understanding and ideas and re-shapes them in the light of the contributions of others. It is only through discussion that he can relate other viewpoints to his own experience. This relationship can be encouraged in two fundamental ways: by exploring connections and examining concepts.

Exploring connections; surveying a field. It is common to use a series of discussion meetings to expand on the themes of a course of lectures. Students may be asked to present short papers uniting the themes of a group of lectures or to write an essay giving an over-view of the group of lectures or to explore related aspects of topics

presented briefly in the lectures. They may be expected to use the lectures as a map to guide them through a mass of background reading preparatory to discussion. Or individual students can be asked to take one of the over-arching concepts of an area of study and to collect a diversity of facts and information that illustrate and support it. Group discussion could then explore the connections between the topics held together by their initial relation to the major concept. Or what about looking at all possible aspects of a subject? Each student could come primed with knowledge of the constitutional, political, social, military or religious history of five important years and in the group they could explore the real relations between these. Or each one could look for examples of energy-producing mechanisms in a wide range of biological systems prior to discussion of how these relate to structural characteristics or the biochemical make-up of such systems.

Examining concepts; connecting ideas. Seminars and other groups have always been used to explore levels of understanding. It may be desirable to go over the material of a lecture again in discussion in response to students' requests. This is very much a bread and butter exercise that is sometimes frowned upon as coaching. Should students keep their misconceptions to themselves in order to express them in an examination? The kind of group that is used to clarify points raised in lectures must be distinguished from that which explores concepts as an exercise in its own right.

Group work can stand on its own. Ideas and concepts can be explored through discussion without much preparation.

In seeking to promote students' understanding, however, the tutor must take care that they have a full say; his explanations and descriptions of the connections between ideas should be kept, where possible, to lectures or defined periods of formal exposition during the meeting. He must get them talking about what they think by asking questions, having a store of new examples to hand for them to discuss; he is ready to help them at difficult points, to keep them from straying, but he does not do the work for them.

A primary aim for the tutor is to get his students away from the accustomed learned-by-heart definitions to the words they find for themselves to express their own understanding of ideas and principles. Many are necessarily learned off; one cannot explore the personal grasp of the meaning of every principle for every student. Some students, perhaps many students, well used to the abstract use of language and with good verbal reasoning powers can, in any case, fully master ideas from a good definition or a written exposition. This is the economic way of learning. But for other students and for difficult concepts it may be worth trying to improve understanding through discussion work. It may, for instance, sometimes be possible to avoid prior definitions and a group can try to arrive at one for themselves - by amalgamating their personal understandings and working co-operatively to achieve an all-embracing and precise formulation.

You can help students to get closer to concepts and to achieve a proper understanding of them for themselves by giving them exercises that involve searching out

convincing illustrations, of concepts they have been taught, from unfamiliar fields. Or get them to prepare converses or corollaries or re-statements of principles in their own words. But discovering a meaning is not enough; students need to practise discriminations and to make constant use of important classifications and distinctions between meanings.[27] Ideally a series of seminars or tutorials would not be chopped up into discrete topics but, where the promotion of understanding is the aim, they should take up and reconsider the same ideas from time to time and should incorporate the use of principles worked over in early meetings in exercises in later meetings.

The final use of small group work we describe is

* the elucidation of misunderstanding.

Students are commonly expected to bring up their difficulties in group discussion appended to lectures but they do not always know what they do not understand. Every effort should be made to discover what misconceptions they are harbouring by skilful questioning, tests and quizzes. What often happens is that tutors, anxious to get some work done, scratch around for a topic by sharp questioning, seize upon the first that engenders a flicker of response and teach to it for the rest of the meeting. Sweeping questions such as "Any problems with the Hegel lecture?" are used for the same purpose. It is better to try and pinpoint likely areas of difficulty beforehand so that statements that open up problem areas can be floated, or a list of study questions can be handed out before meetings that, in essence, ask the students to look at key issues from unfamiliar angles. One can turn a topic round and round just as one might toy with

an idea in one's own mind.

Sometimes a non-specialist tutor may be more help to less able students than an expert, and tutor-less groups can hammer out the relation of ideas and events, provided that they know, in broad terms, how to analyse problems and provided a tutor is available somewhere in the background in case they end up in a tangle or at a dead end.

Multiple choice tests are sometimes used to monitor students' progress and analysis of the results may show up areas where meaningless errors perhaps indicate some kind of functional misunderstanding, patterns of error are obvious clues to follow up too. Item association tests[28] may reveal an imprecise grasp of concepts or unfamiliarity with words and notations some of which may be regularly used in lectures and texts. First year students are obviously weak on terms and on the exact shape and meaning of concepts. (Gibson[25] gives examples of this.) General incomprehension suggests the need to examine the way in which a topic has been taught. Whether or not your teaching, viewed objectively, seems sensible and logical you cannot ignore the fact that what matters is your teaching as your students experience it.

In assessing students' written work and their solutions to problem-solving exercises the tutor will ask himself not just "What does he know?" but "Why does he do no better?" The sort of difficulties students experience include identifying the nature of a problem and its components, or the idea contained in it. They fail to recognise the relevance of their knowledge and thus to

mobilise it. They fail to appreciate the need for system, for following through the logic of an argument or approach and, indeed, to think about the problem.[29] Tutors must try to ask questions sufficiently pertinent to uncover the omission of steps in an argument.[27]

Unsuccessful students seem, at times, to lose sight of their reasons for tackling a problem as they did and their attitudes are negative, discounting the likelihood of doing well before they have even begun. They should not be allowed to suffer defeats continually.[30] Guide them rather towards working out systematic strategies and to writing these down. Advise them to compare problems and encourage them to try and explain why they do not know what to do. The way through a difficulty may become clear when it is defined.

Gilbert's[31] skills-training methods may be used to improve problem-solving techniques. Instead of beginning at step 1 and working stepwise to the end he suggests that students should begin with the last step, then the last two, backward-chaining to step 1 when the whole sequence will have been mastered. The component steps can be seen in relation to the solution at every stage, whereas in progressing from step 1 blocks may not only bring the student to a stop but may restrict his view of what the process leads to or the problem is about, so that he cannot envisage any alternative approach. Many students themselves begin a set of tasks or problems by doing what looks like the most difficult ones first;[32] if they can do these they leave out all the earlier ones.

SUGGESTIONS FOR FURTHER READING

We recommend the following books and articles several of which have been referred to in the text.

TEACHING AND LEARNING IN THE SMALL GROUP

ABERCROMBIE, M.L.J. (1974) *Aims and Techniques of Group Teaching.* (3rd edition) London, S.H.R.E.

The authoritative work.

THE NUFFIELD GROUP for Research and Innovation in Higher Education in association with RUDDUCK, J. (1976). *Small Group Teaching.* London, The Nuffield Foundation.

THE DISTINCTIVE PART THAT SMALL GROUP TEACHING CAN PLAY IN WIDER INSTRUCTIONAL STRATEGIES

COLLIER, K.G. (1968). *New Dimensions in Higher Education.* London, Longmans.

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PARLETT, M. & KING, J.G. (1971). *Concentrated Study - a pedagogic innovation observed.* London, S.H.R.E.

BEARD, R.M. (1972). *Teaching and Learning in Higher Education.* (2nd edition). Harmondsworth, Penguin.

Guidance on how to approach the teaching of intellectual skills and problem-solving.

EXAMPLES OF SMALL GROUP WORK IN PRACTICE

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TEACHING IN HIGHER EDUCATION SERIES

1. Lecturecraft
2. Why Lecture?
3. Working Together
4. Participatory Discussion
5. A Kind of Learning
6. Patterns and Procedures
7. Inside Assessment
8. Essays
9. The Use of Objective Tests

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